Answer to Math Question for May 15, 2012

What is the velocity of flow per second for a 6.0-in. diameter pipe, if it delivers 122 gpm? Assume the pipe is full.

d. 1.4 ft/sec

First, convert gpm to cubic feet per second (cfs).

$$Number\ of\ cfs = \frac{122\ gpm}{(7.48\ gal/ft^2)(60\ sec/min)} = 0.2718\ cfs$$

Next, convert the diameter from inches to feet.

$$Number\ of\ ft = \ (6\ in)\left(\frac{1\ ft}{12\ in}\right) = 0.50\ ft$$

Equation:

$$Flow, cfs = (Area, ft^2)(Velocity, ft/sec); where\ the\ Area = (0.785)(Diameter)^2$$

$$0.2718\ cfs = (0.785)(0.50)^2(Velocity, ft/sec)$$

Rearrange and solve for flow in ft/sec.

$$Velocity, \frac{ft}{sec} = \frac{(0.2718\ cfs)}{(0.785)(0.5\ ft)^2} = 1.38\ cfs, round\ up\ to\ \mathbf{1.4\ ft/sec}$$